**Transition: Advanced Multiplicative to Advanced Proportional Domain:Algebraic Thinking**

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| **Achievement Objectives** | **Number: Level Five** | **Algebra: Level Five** |
| Number Strategies and Knowledge AO2:Use prime numbers, common factors and multiples, and powers [including square roots].Number Strategies and Knowledge AO3:Understand operations on fractions, decimals, percentages, and integers.  | Patterns and Relationships AO2:Relate tables, graphs and equations to linear and simple quadratic relationships found in number and spatial patterns.  |

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| **Strategies being developed** | **References** |
| Find general rules for finding any member of a repeating, sequential pattern, and record the rule algebraically, e.g. In the sequence 5, 8, 11, 14, 17,…the *n*th number is given by 3*n* + 2.Solving 101 = 3*n* + 2 will tell what term in the sequence is 101. | **T*eaching Number Through Measurement, Geometry, Algebra, And Statistics (Book 9)***[Sticky Moments](https://nzmaths.co.nz/node/2520) (34-38)***Figure It Out***Alg 3-4 [Stacking Patterns](https://nzmaths.co.nz/node/2592) (3)Alg 3-4 [Bits and Pieces](https://nzmaths.co.nz/node/3369) (5)Alg 3-4 [Animal Antics](https://nzmaths.co.nz/node/4174) (8)Alg 3-4 [Ten-Storey Thomas](https://nzmaths.co.nz/node/2600) (9)Alg 3-4 [Seeing Dots](https://nzmaths.co.nz/node/2603) (11)Alg 7/8 4.2 [The Power of 2](https://nzmaths.co.nz/node/2691) (18)Alg 7/8 4.3 [Design Day](https://nzmaths.co.nz/node/2718) (6)Alg 7/8 4.3 [Frieze](https://nzmaths.co.nz/node/2724) (14)Alg 7/8 4.3 [Web Circles](https://nzmaths.co.nz/node/2726) (18)Alg 7/8 4.3 [Marooned](https://nzmaths.co.nz/node/2727) (19)Alg 7/8 4.4 [Bathroom Tiles](https://nzmaths.co.nz/node/2753) (8)Alg 7/8 4.4 [Patterns and Designs](https://nzmaths.co.nz/node/2755) (10)Alg 7/8 4.4 [Tiling Spacecraft](https://nzmaths.co.nz/node/2761) (13)Alg 7/8 4.4 [Domino Stacks](https://nzmaths.co.nz/node/2764) (14)Alg 7/8 4.4 [Counting Cubes](https://nzmaths.co.nz/node/2765) (15) |

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| **Strategies being developed** | **References** |
| Use a variety of approaches, including making tables (spreadsheets), creating graphs, and solving equations, to find unknowns from a pattern or relationship. | ***Figure It Out***N 7/8 4.6 [Number Returns](https://nzmaths.co.nz/node/3559) (6)N 7/8 4.6 [Pascal’s Patterns](https://nzmaths.co.nz/node/3563) (9)Alg 7/8 4.2 [Island Roads](https://nzmaths.co.nz/node/2688) (16)Alg 7/8 4.3 [Kidding Around](https://nzmaths.co.nz/node/2719) (8)Alg 7/8 4.3 [Stepping Stones](https://nzmaths.co.nz/node/2720) (9)Alg 7/8 4.3 [Web Circles](https://nzmaths.co.nz/node/2726) (18)Alg 7/8 4.3 [Marooned](https://nzmaths.co.nz/node/2727) (19)Alg 7/8 4.3 [Car Journeys](https://nzmaths.co.nz/node/13527) (22)Alg 7/8 4.3 [Surfboard Sums](https://nzmaths.co.nz/node/13528) (23) Alg 7/8 4.3 [Holiday Pay](https://nzmaths.co.nz/node/2729) (24)Alg 7/8 4.4 [Calendars And Short Cuts](https://nzmaths.co.nz/node/2749) (2)Alg 7/8 4.4 [Number Juggling](https://nzmaths.co.nz/node/2751) (4)Alg 7/8 4.4 [From One To Another](https://nzmaths.co.nz/node/2768) (16)Alg 7/8 4.4 [Areas of Interest](https://nzmaths.co.nz/node/2770) (17)Alg 7/8 4.4 [Mats, Patterns, Rules](https://nzmaths.co.nz/node/2775) (18)Alg 7/8 4.4 [Rotten Apples](https://nzmaths.co.nz/node/2776) (20)Alg 7/8 4.4 [Suspended Thought](https://nzmaths.co.nz/node/2777) (22)Alg 7/8 4.4 [Jam Jars](https://nzmaths.co.nz/node/2778) (24)***nzmaths website***[Holistic Algebra](https://nzmaths.co.nz/node/396) [Linear Graphs And Patterns](https://nzmaths.co.nz/node/401) [All Shapes and Sizes](https://nzmaths.co.nz/node/404) [Fences and Posts](https://nzmaths.co.nz/node/425) [Arithmagons](https://nzmaths.co.nz/node/399) [Fibonacci](https://nzmaths.co.nz/node/400) [Magic Squares](https://nzmaths.co.nz/node/395) [Beanies](https://nzmaths.co.nz/node/402)  |

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| **Strategies being developed** | **References** |
| Solve problems by finding the prime factors of numbers. | ***Figure It Out***N 7/8 4.4 [Igloo Iceblocks](https://nzmaths.co.nz/node/3471) (7)N 7/8 4.6 [Digital Delights](https://nzmaths.co.nz/node/2891) (2)N 7/8 4.6 [Factor Towers](https://nzmaths.co.nz/node/3560) (7) |
| Solve problems the involve exponents and square roots. | ***Figure It Out***N 7/8 4.6 [Powerful Thought](https://nzmaths.co.nz/node/3556) (4)N 7/8 4.6 [Sunburst](https://nzmaths.co.nz/node/3558) (5)N 7/8 4.6 [Tiling Teasers](https://nzmaths.co.nz/node/3561) (8)N 7/8 4.6 [Squaring Off](https://nzmaths.co.nz/node/3573) (18)N 7/8 4.6 [Alien Bacteria](https://nzmaths.co.nz/node/3580) (20)Alg 7/8 4.2 [The Power of 2](https://nzmaths.co.nz/node/2691) (18)Alg 7/8 4.4 [Square Number Differences](https://nzmaths.co.nz/node/2746) (1)Alg 7/8 4.4 [Alien Critters](https://nzmaths.co.nz/node/2756) (12)***nzmaths website***[All Shapes and Sizes](https://nzmaths.co.nz/node/404) [Tilted Squares and Triangles](https://nzmaths.co.nz/node/398)  |
| Find factorials and use factorials to solve problems, e.g. 4! = 1 × 2 × 3 × 4 | ***Figure It Out*** N 7/8 4.5 [Four 4s](https://nzmaths.co.nz/node/4214) (5)N 7/8 4.5 [Plant Patterns](https://nzmaths.co.nz/node/10794) (12)Alg 7/8 4.2 [An Artist’s Delight](https://nzmaths.co.nz/node/2683) (12) |

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